

photographic lens makes us more than welcome Mr. Dallmeyer's book, which, besides supplying a distinct want, will be found a handsome and valuable addition to any photographic library. W. J. S. L.

NEW DATA FOR THE STUDY OF VARIATION.

Ueber einige Aberrationen von Papilio machaon. Von Dr. J. W. Spengel, Professor der Zoologie in Giessen. Pp. 48 Mit 3 Tafeln und 5 Abbildungen im Text. (Jena: Gustav Fischer, 1899.)

IT would be almost superfluous at the present time to offer an apology for the intimate study of variation in animals and plants. Evolutionists of whatever school of thought must necessarily be agreed upon the importance of variation as a factor in the production of new forms, though they may differ widely as to the means by which fresh species become established. In the present state of evolutionary theory it is of the utmost consequence to gain an insight into the laws which regulate variation, and this can only be done by the accumulation of accurate records of the results of experiment and observation. Many views on the subject are current, not one of which can be said to deserve more than a provisional acceptance, and all require to be rigorously tested in the light of facts. Hence any competent observer who—like Bateson, Standfuss, Merrifield and others—devotes himself to laboriously collecting and carefully recording data for the study of variation, whether natural or artificial, deserves well of all those who are interested in the progress of evolutionary theory.

The present treatise is a useful contribution to the mass of material that has lately been accumulating with reference to variation and aberration in the Lepidoptera. It was long ago pointed out by Bates and Wallace, and has often been insisted on since, that to the students of evolutionary law the wings of butterflies afford an unusually favourable field of observation. The days are gone by when the colour-patterns of insects were regarded as mere elegant curiosities, with no particular bearing on any question of scientific interest; and when deviations from the ordinary aspect of the species might be prized indeed by the collector for their rarity, but were thought to be beneath the notice of the genuine biologist. It is now fully recognised in most quarters that there is no real distinction to be drawn between "external characters" and points of structure; and, further, that while both sets of features are equally under the control of natural law, there are many principles of the first importance whose operation is more clearly discerned and more readily investigated in the former than in the latter. During the last few years much greater attention has been directed to the phenomena presented by colour-patterns than was previously the case; and many observers, both in this country and abroad, among whom may be reckoned Weismann, Eimer, Scudder, Mayer, Haase and Piepers, have attempted, with more or less success, to trace the history of existing patterns, and in some cases to formulate the laws under which certain changes of type have been brought about.

The author of the communication before us has occu-

pled himself for many years with the study of natural variation in the "swallow-tail" group of the genus *Papilio*. The results of his investigation of over 2000 specimens still await publication; but in the meantime he has here put on record a very exact description of several forms of the common swallow-tail (*Papilio machaon*), mainly from the collections of Staudinger, Kratz, Standfuss and the Hon. W. Rothschild, which come rather under the head of aberration than of ordinary variation. Some of these have been the result of temperature-experiments, but the greater number have occurred under normal conditions in the open. Dr. Spengel makes no attempt to found any theoretical considerations on the deviations they present, but restricts himself to a statement of fact which, in point of fulness and accuracy, contrasts very favourably with the haphazard descriptions at one time thought sufficient. For details, the reader must refer to the treatise itself; but we may here draw attention to the co-existence of structural with colour-abnormality shown in the remarkable aberration described on pp. 9-16.

The figures are good, and greatly assist in the comprehension of the text. The author's system of nomenclature for the elements of the pattern is easily intelligible, and may be followed without difficulty through the pages of description. As a contribution to the stock of material hitherto available, Dr. Spengel's treatise, though limited in its scope, is of considerable value; and his further analysis of natural variation in allied forms will be awaited with interest. F. A. D.

OUR BOOK SHELF.

A. Koelliker's Handbuch der Gewebelehre des Menschen. Sechste umgearbeitete Auflage. Dritter Band. Von Victor v. Ebner. Erste Hälfte. Verdauungs-organe, Respirations-organe, &c. Pp. vi + 402. (Leipzig: W. Engelmann, 1899.)

FOR the first time in its history the "Handbook of Histology" of the famous Würzburg professor of anatomy appears with the name of an editor upon its title-page in place of the octogenarian master whose book, when it first made its appearance in the 'forties, created an epoch in the history of histological literature, and was made familiar to English readers by its translation by George Busk and Thomas Henry Huxley. The work was a mine of original investigation, and served for many years as a quarry which furnished the materials for the building up of many an account of the structure of the body, in which the source of information was too often, it is to be feared, ignored. In later editions the general style of the book became somewhat altered, as it became necessary for the author to refer to facts regarding microscopic structure which were becoming added by others as well as by himself; and it must be admitted that, while the book thereby accumulated a greater amount of information, it became less readable and unquestionably less original. Nevertheless, the parts of this last edition which have already appeared have fully maintained the place which v. Kölliker's "Gewebelehre" had taken as the first authority upon the subject of which it treats.

In Prof. v. Ebner's hands the character of the rest of the work has been so maintained, and even the literary style so closely imitated, that it would be difficult to detect the alteration in authorship. The amount of labour involved in producing a work of this kind can only be roughly guessed at by those who have never themselves undertaken the task, and Prof. v. Ebner is to be

congratulated upon the success which has attended his labours, which it would appear from the preface have extended over three years. The added illustrations are singularly true to nature, and as numerous as could well be desired. The bibliography is somewhat limited for a work of this kind, and it would have been worth an effort to render the list of works bearing upon the structure of each organ as complete—at least, so far as recent years are concerned—as possible. Nevertheless, important papers are looked for in vain amongst the references. And the lack of an index cannot be too strongly condemned. For it is impossible to understand what object can possibly be served by dispensing with that part of a book the absence of which renders difficult the proper employment of all the rest! Why is it that it is only in German books that we still find this unaccountable tendency to omit the all-important index? Echo can only answer, Why indeed? They do not manage these things better in Germany. But they are beginning to improve.

The Evolution of Geography. A Sketch of the Rise and Progress of Geographical Knowledge from the Earliest Times to the First Circumnavigation of the Globe. By John Keane. Pp. xvi + 160. (London: Edward Stanford, 1899.)

THE second title is more descriptive than the first, which suggests a much more ambitious scheme than the author had before him. This little book makes no claim to originality in matter or method. It is a compilation from accessible sources, and, so far as it goes, is a piece of careful and conscientious work. It is neither critical nor learned, and it would be unfair to review it as if it pretended to such distinction. The chapters are concerned mainly with the history of discovery under the titles of ancient geography, the early Christian ages, the crusading impulse, early and mediæval maps, Henry the Navigator, aids to geographical expansion, and Magellan. The statements of generally acknowledged facts are accurate as a rule, and controversial matters are usually excluded. Mathematical and physical geography do not receive adequate notice, even for so small a scale as is employed.

The first part of the title of the book led us to hope for a philosophical study of the science of geography, and its rise from the earliest times to its present stage of development; but such a work is still to write. Still to write also are studies of early Chinese and Hindu geographical knowledge; indeed, the whole working of the early Oriental mind on geographical problems offers a nearly virgin field, but one that can only be entered by an author well-versed in modern geography and in Eastern languages.

In the present modest work the best feature is undoubtedly the collection of maps, most of them reproduced from previously published English books, but some now shown for the first time in outline on a small scale. It is hard to believe that Magellan's ship, the *Victoria*, really bore her name all along the side in huge letters like a modern light-ship, as the frontispiece shows; but the responsibility for this is relegated to Levinus Hulsius, who published the original drawing in 1602. H. R. M.

First Steps in Earth-Knowledge; being an Introduction to Physiography (Section I.). By J. A. Harrison, B.Sc. Edited by W. J. Harrison. vi + 290 pp. (London: Blackie and Son, Ltd., 1899.)

As the German term "Erdkunde," or its literal rendering, "Earth-Knowledge," signifies something different from an elementary treatment of the fundamental laws of physics and chemistry, such as Mr. Harrison's book provides, his title is a little incorrect and likely to be misleading. At the same time the author gives what is on the whole a satisfactory introduction to science, such

as is included in Section I. of the syllabus in physiology of the Science and Art Department and in the schedule of requirements for pupil-teachers, issued by the Education Department. The book is distinctly attractive, being clearly printed and well illustrated. But certain blemishes have revealed themselves in examining the contents more carefully. We have looked in vain for any reference to the anomalous expansion of water when heated, and no method of determining the temperature at which it possesses its maximum density seems to be given. As so much attention is bestowed upon the construction of thermometers, and the reasons for the employment of mercury are duly tabulated, this omission is rather a grave one. In explaining reflection and refraction of light no reference is made to the simple pin methods of demonstration which are so useful in enabling students to deduce the laws for themselves. The chemistry section would have been improved if a more rational plan of treatment had been adopted.

Die Orkane des "Fernen Ostens." By Prof. Dr. Paul Bergholz. Pp. xii + 260. With 31 lithographed charts, 33 tables, and 7 figures. (Bremen and Shanghai: Max Nössler, 1900.)

THE Kaiser's remark, "Our future lies on the water," has induced Dr. Bergholz, in charge of the Bremen Meteorological Observatory, to devote a great deal of his time to the study of tropical hurricanes, and particularly to those of the Eastern Seas, because, as he states in his preface, the increase of German trade is especially noticeable in Eastern waters, a fact which is demonstrated to Englishmen by the continued transfer of Asiatic steamship lines from the British to the German flag. Dr. Bergholz has summarised all that has previously been written on typhoons, so that the present work is the concentrated essence of our knowledge of these terrible meteors. Every feature in the life-history of a typhoon seems to be carefully dealt with—the origin of the disturbance, its progress, the circulation and the force of the wind, the behaviour of the barometer, the thermometer, the sea, the clouds, and the rainfall. Several special instances are dealt with in detail, and a chapter is devoted to such anomalies as gales unaccompanied by rain, rapid falls of the barometer without increase of wind, strong winds with a slight decline of the barometer, and so on; all which go to prove that old Dampier was right when he declared that the storms of the Temperate Zones, the hurricanes of the West Indies, the cyclones of the Indian Ocean, and the typhoons of the China seas differ only in name. A selection of charts accompanies the work; but while it is permissible to begin the meteorological year with December, in exhibiting the monthly variations of pressure and temperature, there is no sufficient reason why October and November should fall between May and June. The method adopted in drawing the isobars will not meet with the approval of meteorologists, areas of high pressure not being separated in the natural way by areas of low pressure, and *vice versa*, but merely by a dividing line where contrary winds must meet without any intervening calm space. H.

Volumetric Analysis. By John B. Coppock. 92 pp. (London: Whittaker and Co., 1899.)

THIS fragment of science is intended as an appendage to existing books on qualitative analysis so as to meet the requirements of certain examinations in chemistry held by the University of London and the Department of Science and Art. But recent books on analysis which have already come before our notice have met the contingency to which Mr. Coppock refers. Moreover, this is not the first little book with the same object in view. Mr. Coppock covers familiar ground in a familiar way and is, as far as we have seen, a trustworthy guide.